

WHAT IS CLAIMED IS:

1. A light emitting device comprising:  
a thin film transistor on an insulator;

5 an interlayer insulating film on the thin film transistor;

a first insulating film on the interlayer insulating film;

an anode on the first insulating film;

a wiring line for electrically connecting the thin film transistor to the anode;

a bank over the first insulating film, edge portions of the anode, and wiring;

10 a second insulating film on the anode and the bank;

an organic compound layer over the anode with the second insulating film  
interposed therebetween; and

a cathode on the organic compound layer,

wherein the first insulating film is a cured film formed by plasma treatment,

15 and comprises one or more kinds of gas elements selected from the group consisting of  
hydrogen, nitrogen, halogenated carbon, hydrogen fluoride, and rare gas.

2. A light emitting device according to claim 1, wherein the average surface  
roughness (Ra) of a surface of the anode is 0.9 nm or lower.

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3. A light emitting device according to claim 1, wherein the bank has on its  
surface a cured film formed by plasma treatment and comprising one or more kinds of gas  
elements selected from the group consisting of hydrogen, nitrogen, halogenated carbon,  
hydrogen fluoride, and rare gas.

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4. A light emitting device comprising:  
a thin film transistor on an insulator;

an interlayer insulating film on the thin film transistor;

a first insulating film on the interlayer insulating film;

30 an anode on the first insulating film;

a wiring line for electrically connecting the thin film transistor to the anode;

a bank over the first insulating film, edge portions of the anode, and wiring;  
a second insulating film on the anode and the bank;  
an organic compound layer over the anode with the second insulating film  
interposed therebetween; and  
5 a cathode on the organic compound layer,  
wherein the first insulating film is a DLC film.

5. A light emitting device according to claim 4, wherein the average surface  
roughness (Ra) of a surface of the anode is 0.9 nm or lower.

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6. A light emitting device according to claim 4, wherein the bank has on its  
surface a cured film formed by plasma treatment and comprising one or more kinds of gas  
elements selected from the group consisting of hydrogen, nitrogen, halogenated carbon,  
hydrogen fluoride, and rare gas.

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7. A light emitting device comprising:  
a thin film transistor on an insulator;  
an interlayer insulating film on the thin film transistor;  
a first insulating film on the interlayer insulating film;  
20 an anode on the first insulating film;  
a wiring line for electrically connecting the thin film transistor to the anode;  
a bank over the first insulating film, edge portions of the anode, and wiring;  
a second insulating film on the anode and the bank;  
an organic compound layer over the anode with the second insulating film  
25 interposed therebetween; and  
a cathode on the organic compound layer,  
wherein the first insulating film is a silicon nitride film.

8. A light emitting device according to claim 7, wherein the average surface  
30 roughness (Ra) of a surface of the anode is 0.9 nm or lower.

9. A light emitting device according to claim 7, wherein the bank has on its surface a cured film formed by plasma treatment and comprising one or more kinds of gas elements selected from the group consisting of hydrogen, nitrogen, halogenated carbon, hydrogen fluoride, and rare gas.

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10. A light emitting device comprising:

a thin film transistor on an insulator;

an interlayer insulating film on the thin film transistor;

a first insulating film on the interlayer insulating film;

10 an anode on the first insulating film;

a wiring line for electrically connecting the thin film transistor to the anode;

a bank over the first insulating film, edge portions of the anode, and wiring;

a second insulating film on the anode and the bank;

15 an organic compound layer above the over with the second insulating film interposed therebetween; and

a cathode on the organic compound layer,

wherein the first insulating film comprises a cured film formed by plasma treatment and a DLC film.

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11. A light emitting device according to claim 10, wherein the average surface roughness (Ra) of a surface of the anode is 0.9 nm or lower.

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12. A light emitting device according to claim 10, wherein the bank has on its surface a cured film formed by plasma treatment and comprising one or more kinds of gas elements selected from the group consisting of hydrogen, nitrogen, halogenated carbon, hydrogen fluoride, and rare gas.

13. A light emitting device comprising:

30 a thin film transistor on an insulator;

an interlayer insulating film on the thin film transistor;

a first insulating film on the interlayer insulating film;

an anode on the insulating film;  
a wiring line for electrically connecting the thin film transistor to the anode;  
a bank over the first insulating film, edge portions of the anode, and wiring;  
a second insulating film on the anode and the bank;  
5 an organic compound layer over the anode with the second insulating film  
interposed therebetween; and  
a cathode on the organic compound layer,  
wherein the first insulating film is a cured film formed by plasma treatment and  
a silicon nitride film.

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14. A light emitting device according to claim 13, wherein the average surface roughness (Ra) of a surface of the anode is 0.9 nm or lower.

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15. A light emitting device according to claim 13, wherein the bank has on its surface a cured film formed by plasma treatment and comprising one or more kinds of gas elements selected from the group consisting of hydrogen, nitrogen, halogenated carbon, hydrogen fluoride, and rare gas.

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16. A light emitting device comprising:  
a thin film transistor on an insulator;  
an interlayer insulating film on the thin film transistor;  
a first insulating film on the interlayer insulating film;  
an anode on the insulating film;  
a wiring line for electrically connecting the thin film transistor to the anode;  
25 a bank over the first insulating film, edge portions of the anode, and wiring;  
a second insulating film on the bank;  
an organic compound layer on the anode and the bank; and  
a cathode on the organic compound layer,  
wherein the second insulating film is a silicon nitride film.

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17. A light emitting device according to claim 16, wherein the average surface

roughness (Ra) of a surface of the anode is 0.9 nm or lower.

18. A light emitting device according to claim 16, wherein the bank has on its surface a cured film formed by plasma treatment and comprising one or more kinds of gas  
5 elements selected from the group consisting of hydrogen, nitrogen, halogenated carbon, hydrogen fluoride, and rare gas.

19. A device comprising:

a thin film transistor on an insulator;

10 a first interlayer insulating film over the thin film transistor;

an electrode over the first interlayer insulating film;

a wiring line for electrically connecting the thin film transistor to the electrode, over the first interlayer insulating film;

15 a second interlayer insulating film over the first interlayer insulating film, the electrode, and the wiring line; and

an anti-electrostatic film over the second interlayer insulating film.

20 20. A light emitting device according to claim 19, wherein the electrode is an anode or a cathode.

21. A method of manufacturing a device according to claim 19, wherein the film an organic conductive material comprises selected from the group consisting of polyethylene dioxythiophene, polyaniline, glycerin fatty acid ester, polyoxyethylene alkyl ether, N-2-Hydroxyethyl-N-2-hydroxyalkylamine [hydroxyalkyl monoethanolamine],  
25 N,N-Bis(2-hydroxyethyl)alkylamine [alkyl diethanolamine], alkyl diethanolamide, polyoxyethylene alkylamine, polyoxyethylene alkylamine fatty acid ester, alkyl sulfonate, alkylbenzenesulfonate, alkyl phosphate, tetraalkylammonium salt, trialkylbenzyl ammonium salt, alkyl betaine, alkyl imidazolium betaine, and polyoxyethylene alkylphenyl ether,

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22. A light emitting device according to claim 21, wherein the organic

conductive material is formed by spin coating or evaporation.

23. A light emitting device according to claim 19, wherein the anti-electrostatic film comprises an organic insulating material selected from the group consisting of  
5 polyimide, acrylic, polyamide, polyimideamide, or benzocyclobutene.

24. A semiconductor device according to claim 19, wherein the device further comprises an organic compound layer over the second interlayer insulating film and a cathode on the organic compound layer.

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25. A method of manufacturing a light emitting device comprising the steps of:  
forming an interlayer insulating film on a thin film transistor formed on an insulator;

15 forming a first insulating film on the interlayer insulating film;  
forming a wiring line on the first insulating film;  
forming an anode electrically connected to the thin film transistor through the wiring line, on the first insulating film;

20 forming a resin insulating film that covers the anode and the wiring line;  
etching the resin insulating film to form a bank;  
conducting heat treatment to the resin insulating film;  
wiping the anode;  
forming a second insulating film to cover the anode and the bank;  
forming an organic compound layer on the second insulating film; and  
forming a cathode on the organic compound layer.

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26. A method of manufacturing a light emitting device according to claim 25, wherein plasma treatment is performed on the bank.

27. A method of manufacturing a light emitting device according to claim 25,  
30 wherein plasma treatment is carried out in one or more kinds of gas selected from the group consisting of hydrogen, nitrogen, halogenated carbon, hydrogen fluoride, and rare

gas.

28. A method of manufacturing a light emitting device according to claim 25, wherein the step of wiping the anode uses a PVA-based porous material.

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29. A method of manufacturing a light emitting device according to claim 25, wherein the step of wiping the anode is a step for leveling the surface of the anode.

30. A method of manufacturing a light emitting device comprising the steps of:  
10 forming an interlayer insulating film on a thin film transistor formed on an insulator;

forming a first insulating film on the interlayer insulating film;

forming a wiring line on the first insulating film;

forming an anode electrically connected to the thin film transistor through the

15 wiring line, on the first insulating film;

conducting first heat treatment to the anode;

forming a resin insulating film that covers the anode and the wiring line, and etching the resin insulating film to form a bank;

conducting second heat treatment to the resin insulating film;

20 wiping the anode;

forming a second insulating film to cover the anode and the bank;

forming an organic compound layer on the second insulating film; and

forming a cathode on the organic compound layer.

25 31. A method of manufacturing a light emitting device according to claim 30, wherein plasma treatment is performed on the bank.

32. A method of manufacturing a light emitting device according to claim 30, wherein plasma treatment is carried out in one or more kinds of gas selected from the  
30 group consisting of hydrogen, nitrogen, halogenated carbon, hydrogen fluoride, and rare gas.

33. A method of manufacturing a light emitting device according to claim 30, wherein the step of wiping the anode uses a PVA-based porous material.

5 34. A method of manufacturing a light emitting device according to claim 30, wherein the step of wiping the anode is a step for leveling the surface of the anode.

10 35. A method of manufacturing a light emitting device comprising the steps of: forming an interlayer insulating film on a thin film transistor formed on an insulator;

forming a first insulating film on the interlayer insulating film;

forming a wiring line;

15 forming an anode electrically connected to the thin film transistor through the wiring line;

conducting first heat treatment to the anode;

forming a resin insulating film that covers the anode and the wiring line, which serves a bank;

conducting second heat treatment to the resin insulating film;

etching the resin insulating film to form a bank;

20 wiping the anode;

forming an insulating film to cover the anode and the bank;

forming an organic compound layer on the insulating film; and

forming a cathode on the organic compound layer.

25 36. A method of manufacturing a light emitting device according to claim 35, wherein plasma treatment is performed on the bank.

37. A method of manufacturing a light emitting device according to claim 35, wherein plasma treatment is carried out in one or more kinds of gas selected from the 30 group consisting of hydrogen, nitrogen, halogenated carbon, hydrogen fluoride, and rare gas.

38. A method of manufacturing a light emitting device according to claim 35, wherein the step of wiping the anode uses a PVA-based porous material.

5 39. A method of manufacturing a light emitting device according to claim 35, wherein the step of wiping the anode is a step for leveling the surface of the anode.

10 40. A method of manufacturing a light emitting device comprising the steps of: forming an interlayer insulating film on a thin film transistor formed on an insulator;

15 performing plasma treatment on a surface of the interlayer insulating film; forming a wiring line; forming an anode electrically connected to the thin film transistor through the wiring line;

20 forming a resin insulating film that covers the anode and the wiring line; etching the resin insulating film to form a bank; conducting heat treatment to the resin insulating film; wiping the anode; forming an insulating film to cover the anode and the bank; forming an organic compound layer on the insulating film; and forming a cathode on the organic compound layer.

25 41. A method of manufacturing a light emitting device according to claim 40, wherein plasma treatment is performed on the bank.

30 42. A method of manufacturing a light emitting device according to claim 40, wherein plasma treatment is carried out in one or more kinds of gas selected from the group consisting of hydrogen, nitrogen, halogenated carbon, hydrogen fluoride, and rare gas.

43. A method of manufacturing a light emitting device according to claim 40,

wherein the step of wiping the anode uses a PVA-based porous material.

44. A method of manufacturing a light emitting device according to claim 40, wherein the step of wiping the anode is a step for leveling the surface of the anode.

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45. A method of manufacturing a light emitting device comprising the steps of: forming an interlayer insulating film on a thin film transistor, the thin film transistor being formed on a substrate having an insulating surface;

10 performing plasma treatment on a surface of the interlayer insulating film; forming an anode over the interlayer insulating film; forming a wiring line over the interlayer insulating film; forming a resin insulating film that covers the anode, the wiring line and the interlayer insulating film;

15 moving the substrate on which the thin film transistor is formed from a first processing room to a second processing room;

20 etching the resin insulating film to form a bank; conducting heat treatment; performing plasma treatment on a surface of the bank; wiping the anode; forming an insulating film to cover the anode and the bank; forming an organic compound layer on the insulating film; and forming a cathode on the organic compound layer.

46. A method of manufacturing a light emitting device according to claim 45, 25 wherein the anode partially overlaps the wiring line so that the anode is electrically connected to the thin film transistor.

47. A method of manufacturing a light emitting device according to claim 45, 30 wherein plasma treatment is carried out in one or more kinds of gas selected from the group consisting of hydrogen, nitrogen, halogenated carbon, hydrogen fluoride, and rare gas.

48. A method of manufacturing a light emitting device according to claim 45, wherein the step of wiping the anode uses a PVA-based porous material.

5 49. A method of manufacturing a light emitting device according to claim 45, wherein the step of wiping the anode is a step for leveling the surface of the anode.

10 50. A method of manufacturing a device comprising the steps of:  
forming a thin film transistor formed over a substrate having an insulating  
surface;

forming an interlayer insulating film over the thin film transistor;  
forming an electrode over the interlayer insulating film;  
forming a wiring line connecting the anode with the thin film transistor, over  
the interlayer insulating film;

15 forming a resin insulating film over the electrode, the wiring line and the  
interlayer insulating film;  
moving the substrate over which the thin film transistor is formed from a first  
processing room to a second processing room.

20 51. A method of manufacturing a light emitting device according to claim 50,  
wherein the electrode is an anode or a cathode.

25 52. A method of manufacturing a device comprising the steps of:  
forming a thin film transistor formed over a substrate having an insulating  
surface;  
forming an interlayer insulating film over the thin film transistor;  
forming an electrode over the interlayer insulating film;  
forming a wiring line connecting the anode with the thin film transistor, over  
the interlayer insulating film;  
30 forming a resin insulating film over the anode, the wiring line and the  
interlayer insulating film;

forming a film for preventing the substrate over which the thin film transistor is formed from a contamination and an electrostatic discharge damage.

53. A method of manufacturing a light emitting device according to claim 52,  
5 wherein the electrode is an anode or a cathode.

54. A method of manufacturing a device according to claim 52, wherein the film an organic conductive material comprises selected from the group consisting of polyethylene dioxythiophene, polyaniline, glycerin fatty acid ester, polyoxyethylene alkyl ether, N-2-Hydroxyethyl-N-2-hydroxyalkylamine [hydroxyalkyl monoethanolamine], N,N-Bis(2-hydroxyethyl)alkylamine [alkyl diethanolamine], alkyl diethanolamide, polyoxyethylene alkylamine, polyoxyethylene alkylamine fatty acid ester, alkyl sulfonate, alkylbenzenesulfonate, alkyl phosphate, tetraalkylammonium salt, trialkylbenzyl ammonium salt, alkyl betaine, alkyl imidazolium betaine, and polyoxyethylene alkylphenyl ether,  
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55. A method of manufacturing a light emitting device according to claim 54,  
wherein the film an organic conductive material is formed by spin coating or evaporation.

20 56. A method of manufacturing a light emitting device according to claim 52,  
wherein the film comprises an organic insulating material selected from the group consisting of polyimide, acrylic, polyamide, polyimideamide, or benzocyclobutene.

25 57. A method of manufacturing a light emitting device according to claim 52,  
wherein the method further comprises the steps of removing the film, etching the resin insulating film to form a bank, wiping the anode, forming an organic compound layer over the bank and the anode.

30 58. A method of manufacturing a device comprising the steps of:  
removing an anti-electrostatic film formed on a resin insulating film, the resin insulating film formed over a thin film transistor and anode;

etching the resin insulating film to form a bank;  
baking the bank in a vacuum;  
forming an organic compound layer over the bank and the anode;  
forming a cathode on the organic compound layer.

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59. A method of manufacturing a device according to claim 58, wherein the film an organic conductive material comprises selected from the group consisting of polyethylene dioxythiophene, polyaniline, glycerin fatty acid ester, polyoxyethylene alkyl ether, N-2-Hydroxyethyl-N-2-hydroxyalkylamine [hydroxyalkyl monoethanolamine],  
10 N,N-Bis(2-hydroxyethyl)alkylamine [alkyl diethanolamine], alkyl diethanolamide, polyoxyethylene alkylamine, polyoxyethylene alkylamine fatty acid ester, alkyl sulfonate, alkylbenzenesulfonate, alkyl phosphate, tetraalkylammonium salt, trialkylbenzylammonium salt, alkyl betaine, alkyl imidazolium betaine, and polyoxyethylene alkylphenyl ether,

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60. A method of manufacturing a light emitting device according to claim 59, wherein the organic conductive material is formed by spin coating or evaporation.

61. A method of manufacturing a light emitting device according to claim 58,  
20 wherein the anti-electrostatic film comprises an organic insulating material selected from the group consisting of polyimide, acrylic, polyamide, polyimideamide, or benzocyclobutene.